

CLAIMS

1. An antioxidant composition comprising at least one non-reducing sugar or sugar polyol, wherein the antioxidant
5 composition is operable to inhibit oxidation of highly polyunsaturated lipids in oil-in-water or water-in-oil emulsions.

2. The composition of Claim 1, further comprising a
10 sulfated polysaccharide.

3. The composition of Claim 2, further comprising the sulfated polysaccharide selected from the group consisting of: iota-carrageenan, kappa-carrageenan, lambda-carrageenan, and
15 any combinations thereof.

4. The composition of Claim 1, further comprising a medium-chain triglyceride.

20 5. The composition of Claim 4 further comprising a medium-chain tryglyceride selected from the group consisting of: caproic (C:6.0), caprylic (C:8.0), and capric (C:10.0) trylglycerides, and any combinations thereof.

25 6. The composition of Claim 1, further comprising a casein or fragment thereof.

7. The composition of Claim 6, further comprising the casein or fragment thereof selected from the group consisting
30 of: alpha-casein, beta-casein, kappa-casein, fragments thereof, and any combinations thereof.

8. The composition of Claim 6, wherein the casein or fragment thereof comprises a caprine casein or fragment thereof.

5 9. The composition of Claim 1, further comprising a phosphopeptide.

10 10. The composition of Claim 9, further comprising a phosphopeptide having high amounts of α_{s2} -casein and medium-chain triglycerides.

11. The composition of Claim 10, further comprising a caseinophosphopeptide.

15 12. The composition of Claim 11 further comprising a caprine caseinophosphopeptide.

20 13. The composition of Claim 1, further comprising a glycopeptide.

25 14. The composition of Claim 1, further comprising an ingredient selected from the group of: alpha, beta, gamma or delta tocopherols, alpha, beta, gamma or delta tocotrienols, tocopherols, tocotrienols, beta-carotene, phospholipids, chitosan and any combinations thereof.

30 15. The composition of Claim 1, further comprising a phospholipid selected from the group consisting of: egg yolk phospholipids, soybean phospholipids, and any combinations thereof.

16. The composition of Claim 1, further comprising a pH modifier.

17. The composition of Claim 16, further comprising the
5 pH modifier selected from the group consisting of: citric acid, ascorbic acid, gluconic acid, and any combinations thereof.

18. The composition of Claim 1, further comprising a
10 chelating agent.

19. The composition of Claim 1, the chelating agent further comprising citric acid.

15 20. The composition of Claim 1, further comprising a polyphenol derived from the fruit of *Solanum melongena*.

21. An antioxidant microemulsion or nanoemulsion comprising at least one non-reducing sugar or sugar polyol, wherein the antioxidant composition is operable to inhibit oxidation of highly polyunsaturated lipids in the emulsion.

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22. The microemulsion or nanoemulsion of Claim 21, further comprising a modified starch.

23. The microemulsion or nanoemulsion of Claim 21,
10 further comprising a sulfated polysaccharide.

24. The microemulsion or nanoemulsion of Claim 21, further comprising a glyceride.

15 25. The microemulsion or nanoemulsion of Claim 24, further comprising the glyceride selected from the group consisting of: enzymatically modified oils, fats, and fatty acids of mono-, di-, and tri-glycerides; lipolyzed modified oils, fats, and fatty acids of mono-, di-, and tri-glycerides;
20 and any combinations thereof.

26. The microemulsion or nanoemulsion of Claim 21, further comprising a fruit concentrate sweetener.

25 27. The microemulsion or nanoemulsion of Claim 26, wherein the fruit concentrate sweetener comprises:
a blend of hydrolyzed starch having a dextrose equivalent (D.E.) of up to approximately 25;
fruit juice or fruit syrup concentrate of at least
30 approximately 40% soluble solids; and
approximately 0% insoluble solids,
wherein the starch, juice or concentrate and solids form

a liquor having a dry weight composition of approximately 40 to approximately 65% complex carbohydrates, approximately 35 to approximately 55% simple sugars from the fruit juice or fruit syrup concentrate, and approximately 0 to approximately 5% nutritional components occurring naturally in the fruit juice or fruit syrup concentrate.

28. The microemulsion or nanoemulsion of Claim 21 further comprising cocoa powder.

29. The microemulsion or nanoemulsion of Claim 21 further comprising Sucralose.

30. The microemulsion or nanoemulsion of Claim 21, further comprising a calcium or magnesium salt, or combination thereof, the microemulsion or nanoemulsion is operable to prevent hypercholesterolemia in a mammal.

31. The microemulsion or nanoemulsion of Claim 21, further comprising a calcium or magnesium salt or combination thereof, the microemulsion or nanoemulsion is operable to prevent bone mineral loss in a mammal.

32. The microemulsion or nanoemulsion of Claim 21, further comprising:
a calcium or magnesium salt or combination thereof; and
an oil rich in Omega-3 products.

33. The microemulsion or nanoemulsion of Claim 21, further comprising an oil-soluble flavor product.

34. The microemulsion or nanoemulsion of Claim 21, further comprising an oil-soluble vitamin, nutraceutical, or pharmaceutical product.

5 35. The microemulsion or nanoemulsion of Claim 21, further comprising an edible oil selected from the group consisting of: vegetable oils including rice bran oil, flax, chia, hemp, castor, soybean, lesquerella, dehydrated castor oil, rich in Omega-3, or conjugated linoleic acid, animal oils
10 including fish, egg, poultry, and beef oils rich in Omega-3, conjugated linoleic acid, and any combinations thereof.

36. The microemulsion or nanoemulsion of Claim 21, further comprising a calcium or magnesium salt or combination
15 thereof, the microemulsion or nanoemulsion is present in a transparent beverage product.

37. The microemulsion or nanoemulsion of Claim 21, further comprising the microemulsion or nanoemulsion present
20 in a cocoa product having improved creaminess, reduced bitterness, and reduced oxidation.

38. The microemulsion or nanoemulsion of Claim 21, further comprising the microemulsion present in a protein rich
25 product having reduced protein settling and sedimentation.

39. The microemulsion or nanoemulsion of Claim 38, further comprising the protein rich product including high-methoxyl pectins or pectin alginates or combinations thereof.

40. The microemulsion or nanoemulsion of Claim 21,
further comprising an oil-in-water microemulsion or
nanoemulsion having increased emulsion and oxidation
stability.

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41. The microemulsion or nanoemulsion of Claim 21,
further comprising a water-in-oil microemulsion or
nanoemulsion having increased emulsion and oxidation
stability.

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42. A product comprising at least one non-reducing sugar or sugar polyol, wherein the antioxidant composition is operable to inhibit oxidation of highly polyunsaturated lipids in oil-in-water or water-in-oil emulsions.

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43. The product of Claim 42, wherein the product is selected from the group consisting of: cocoa products, hypercholesterolemia preventatives, bone mineral loss preventatives, Omega-3-rich oil products, products having oil-
10 soluble flavors, products having oil-soluble vitamins, nutraceuticals, or pharmaceuticals, protein rich products having reduced protein settling and sedimentation, transparent beverages, products containing vegetable oils including rice bran oil, flax, chia, hemp, castor, soybean, lesquerella,
15 dehydrated castor oil, rich in Omega-3, or conjugated linoleic acid, animal oils including fish, egg, poultry, and beef oils rich in Omega-3, or conjugated linoleic acid, and any combinations thereof.